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ABSTRACT

This study provides a description and analysis of how teachers read research in light of prior beliefs about what research is and how it should influence teaching. Attention to teachers' beliefs has become an essential feature of studies designed to help understand research. The beliefs on which researchers and teacher educators typically focus are teachers' beliefs about teaching and learning. Teachers' beliefs about the use of educational research influences understanding. Participants (N=13), teachers with substantially different research experiences, were interviewed subsequent to reading and responding to three different types of research articles and two sets of research findings. They were then asked to evaluate what had been read. Results indicate that in light of teachers' prior beliefs there are substantial differences in terms of willingness and/or ability to read and understand research. If research is to play a role in educating teachers, it is suggested that teacher educators and researchers pay attention to how teachers read research, and to their beliefs and understandings.
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NCRTL

National
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on Teacher Learning

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HOW DO TEACHERS UNDERSTAND RESEARCH WHEN THEY READ IT?

John S. Zeuli

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Abstract

Attention to teachers' beliefs has become an essential feature of studies designed to help teachers understand research. The beliefs on which researchers and teacher educators typically focus are teachers' beliefs about teaching and learning. Teachers' beliefs about educational research, however, may also strongly influence their understanding and use of research. This study provides a description and analysis of how teachers read research in light of their prior beliefs about what research is and how it should influence their teaching. The subjects of the study were two distinct groups of teachers with varying levels of prior involvement with educational research. One group included five former "teacher collaborators" who had worked with researchers on research projects for at least one year. The second group was comprised of eight teachers with considerably less experience with research.

Teachers read and responded to three different types of research articles and two research findings. How teachers evaluated the research articles and findings is described and analyzed as well as the different types of evidence teachers cite as credible to them. In light of teachers' prior belief about research, the author shows that teachers differed substantively in terms of their willingness and/or ability to read and understand research. Consequently, the author suggest that teacher educators and researchers pay attention both to teachers' beliefs about research and how they read research if research, broadly conceived, is to play a role in educating teachers.

HOW DO TEACHERS UNDERSTAND RESEARCH WHEN THEY READ IT?[1]

John S. Zeuli[2]

Overview

Reading research is closely interwoven with teachers' and prospective teachers' learning about teaching. Good (1989), for example, argues that "professionals or teachers who are too busy to read are not professionals" (p. 35). While Good's conception of a professional may seem idiosyncratic or tautological, the relevance of teachers' reading research makes sense. All prospective teachers read research in their foundations and methods courses. Teachers read research in their graduate education courses and sometimes read it for inservices and professional meetings. Based on the amount of research teachers read and are expected to read throughout their preparation as teachers and their continuing education, reading research is one important way teachers learn about teaching.

Teachers, of course, learn about teaching from sources unconnected to educational research—most notably their own teaching experiences. Teachers also can learn from research without reading it. Researchers, for example, may discuss research with teachers, and teachers learn from these discussions without reading the research. These points suggest that educational research is one, among other, sources for learning about teaching and that reading research is not necessary in order for teachers to learn about teaching from research.

These points notwithstanding, teachers reading research remains strongly linked to their professional development. Research of various types forms the bulwark of teachers' professional preparation, and teachers are expected to learn about teaching from research throughout their careers. This learning from research commonly entails that teachers read it. And, professional norms exist that encourage teachers to study research closely and discuss what they have read with colleagues. Thus, reading research is an important component of teachers' professional education and worthy of researchers' attention.

There have been, however, few studies of how teachers read research. What teachers read, as opposed to how they read it, has long been an object of inquiry. In 1903, studies of public school teachers in New York City found William James's *Talks to Teachers* and

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[1]This paper was originally presented at the annual meeting of the American Education Research Association in April 1992 in San Francisco.

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Charles Eliot's *Educational Reform* on some teachers' reading lists. Most teachers, however, read mostly contemporary fiction, and new teachers' interest in reading research was found to wane quickly as their teaching experienced increased (Pretlow, 1903, p. 341; Wilde, 1903, p. 348).

The 1933 national survey of teachers by Frazier et al. (1935) included a section on the reading interests of teachers. Consistent with the changing focus of educational research at the Depression's onset, the survey's purpose was to determine teachers' interest in social change based on what they read. Frazier and his associates found that teachers' social concerns were "not much more enlightened" than those of the population at large (p. 256). Over 30 years later, a study of 270 teachers in the United Kingdom found that teachers could not be relied on "to read just one serious book on Education or Psychology" each year (Johnson, 1966, p. 78) and only a small proportion of them read educational journals (Johnson, 1963).

This paper goes beyond traditional studies of looking at what teachers read and raises questions about how they understand research when they read it. Teachers were first asked open-ended questions about what they look for when they read research. They were then asked to read three articles and respond to questions about the authors' main points, how the authors' attempted to convince them of these points, and the different types of evidence presented in the articles. In addition, teachers responded to two short research findings and asked what conclusions they would draw from the findings for their teaching and why.

The Sample

Two groups of teachers with substantially different research experiences were included in the study. One group of teachers (n = 5) was composed of former teacher collaborators who had spent at least one year working with educational researchers on research projects related to teaching and learning in public schools (see Porter, 1986). In addition, the five teacher collaborators had all received master's degrees in education and each had at least 12 years of teaching experience. Two of the collaborators were male. Another group of teachers (n = 8) had considerably less prior experience with research. None had worked on any long-term research project. Seven of these teachers, however, either had a master's degree in education or were one course shy of obtaining it. Two of the eight teachers in the second group were first-year teachers. The six other teachers in the second group had between 4 and 10 years of teaching experience. One teacher in the second group was male.

All subjects volunteered to be part of the interview study. A list was provided to the researcher of former teacher collaborators. They were then asked if they would be willing to participate. The other practicing teachers who participated were drawn from a pre-enrollment list of master's students taking a classroom research course (n = 4). Another four practicing teachers were chosen based on recommendations from other educators (teachers and teacher educators) working with teachers in local school districts. Though the sample of teachers interviewed in the study is unrepresentative, it is important to bear in mind that interviewees' responses are suggestive of the way teachers read research. Table 1 indicates the pseudonyms teachers in each group were given for the study.

How Did Teachers Read Research?

Analyzing how teachers read research proceeds in two ways. First, I look at teachers' self-descriptions of how they read it. Second, I analyze what teachers did when they actually read three articles pertaining to research and responded to two research findings. Teachers' responses are important for several reasons. They indicate whether teachers' prior beliefs about research are in some way associated with their manner of reading research.[3] Also, teachers' responses provide the teacher education and research community a better sense of what sorts of evidence teachers initially find credible (see Floden, 1985). Teachers' responses also indicate the degree to which research serves to educate them.

This latter point needs elaboration. When reading particular types of research, teachers can seek ideas or steps to take in order to improve a component of their teaching. If the focus is on *doing* without teachers seeking any additional justification for *why* they should do it, reading research may help teachers improve their performance, but it does not serve to educate them. When reading research furthers the education of teachers, teachers

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[3]Prior to being interviewed about how they read research, teachers were interviewed during a one-hour session about (a) what they believe research is and (b) how they think research should influence their teaching. To find out teachers' beliefs about what research is, teachers responded to a card-sort task that included abstracts of different types of research studies. They were asked to state whether these carefully written and adapted abstracts constituted their idea of educational research. Teachers' responses were categorized as indicating teachers possessed a *narrow* definition of research (only quantitative studies); a *broad* definition (teachers included qualitative, historical, philosophical, and quantitative studies in their definition of research); or an *unclear* definition (i.e., teachers consistently mixed up prescriptive statements about teaching and learning with abstracts of different types of research studies).

To find out how teachers thought about the influence of research on their teaching, teachers responded to one-page vignettes that described different ways research can influence teachers. Sample teachers could identify themselves as believing research should mainly or exclusively provide strategies and techniques to have a *direct impact* on their teaching. In contrast, sample teachers could identify themselves as believing research should have an *indirect impact*; i.e., the value of research is to help raise questions about their teaching and offer analytic frameworks with which they can better understand their work. Teachers who believed research should have an indirect impact typically suggested that the direct impact view of research's influence was much too narrow.

are engaged in a process of trying to understand and to evaluate the concepts and claims that compose the study. If teachers are unable to raise questions about research concepts, evidence, or assumptions, or do not pay any attention to them, research does not educate them (Cherryholmes, 1990; Floden, 1985; Phillips, 1971, 1980). So, the manner in which teachers read research is inextricably linked to its educative worth.

Teachers' Self-Descriptions of How They Read Research

> You know what I usually do is skip the research because I figure they're right anyway. They've done the research. I don't need to know about the research. I go for the steps that I need to know. What are the things that I can take back to the classroom that are going to work for me? (Karla, p. 18)[4]

Karla's view of how to read research assumes that research results are certain, that learning about research assumptions and methods serves no purpose, that what procedures to follow is the most important conclusion to draw from research, and that judging and interpreting the study's merit is based primarily on whether the procedures work when she tries them in her classroom. Another teacher offered a contrasting response based on different criteria for reading research. Cheryl said she focused on the study's coherence, and whether the study is "organized enough so that you can follow it." Cheryl wants to understand research on its own terms:

> Does it come up with some kind of sensible conclusion that you can process and do something with in your head? Can you take it in and do something with it, then apply it in some way to your own existence or discount it on the basis of some set of criteria? . . . You don't have to agree with it, but you have to be able to understand what it is that the original author was trying to make clear. (p. 18)

Research must be understood in its own terms to Cheryl. "Processing" research does not only mean finding what procedures to use. Agreement or disagreement with a study is based more on understanding it and less on whether applicable findings drawn from the study work with her class.

The stark contrast between Karla and Cheryl is mirrored in other teachers' responses. Lynda stated that although she had been told that the "conclusions sometimes are not

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[4]Page numbers refer to transcripts of interviews with the teachers.

Table 1

Types of Teachers[a] in the Study

Group 1 Teacher Collaborators	Group 2 Teachers with Less Research Experience	
Bryan	Leisa (MC)[b]	Nicole
Cheryl	Karla (MC)	Ana Marie
Geoff	Lynda (MC)	Nick (BT)[c]
Fran	Andrea (MC)	Jessica (BT)
Kathleen		

[a]Names of all teachers are pseudonyms.

[b]MC = Teacher pre-enrolled in a master's course on classroom research.

[c]BT = Beginning teacher.

validated by the statistics," she "always go[es] to the conclusions; what are they really trying to tell me" (p. 11). While Jessica mentioned that she looks for how the study was conducted and how that affected the findings, her focus was on research findings. She stated that she looked first at research findings, because "the findings are ultimately what either asks you to evaluate the way you do things or think about things" (p. 15). Nicole also focused primarily on research findings. She says that she read it to determine primarily whether there is "anything I can use and if it applies to me. More realistic things than idealistic things. I guess I don't look at how many people they researched. It's just a reaction I have; oh, that's a neat idea" (p. 19).

Like Cheryl, some teachers said that they did not focus on findings when reading research. Geoff said that he read research searching for how researchers support their claims. He needs more than "somebody that says this is true because I know I did it in my classroom and it really works" (p. 24). He does not "pore over" the graphs and tests of significance because he figures researchers know how to do that. Nevertheless, he states, "I look for the care that was put into making sure that what they try to tell me they think is going on can be validated by some sort of experimenting" (p. 23).

Geoff's statement is consistent with his narrow view of what research is. Quantitative studies represented his view of what research is, and consequently he discusses reading these types of studies. He wants to know about sample selection and whether treatment effects can be validated. His strategy when reading is to find out first what researchers claim they are after and then what they found. He then goes back to study how researchers came to their conclusions (p. 23).

Fran said that she focused first on the study's "premise—what are they setting out to say." The study has to be interesting, but she does not have to agree with it. She reads the research, "stores the knowledge away in long-term memory" and then "thinks about the ideas in her teaching practice" (p. 19). Fran refers more to grasping the idea in the research, thinking about it, and then over a long period of time trying to integrate that idea into her thinking about teaching. Teaching strategies drawn from the research are secondary, but, if appropriate, classroom experimentation based on a research idea will influence her thinking about it. Kathleen said that she looks for precisely what researchers are attempting, which variables they concentrate on, and how researchers choose their sample. She wants to find out research procedures "seem logical" to her (p. 21).

Some study teachers were unsure what to look for or gave unclear responses. For both Andrea and Leisa there was an explicit and implicit uncertainty about to look for. Andrea said "reliability" at first, but then admitted that "I was trying to come up with some

response; I wasn't really sure" (p. 14). Leisa said that she looked for what the study involved but was not very clear what this entailed: "If there was a study that took place, what the study involved, were they both the same or if they were different, and I'd like to look at what date this took place" (p. 13). Ana Marie stated simply that she looks for relevance to what she is doing in her classroom, first, and whether the research is believable, second.

Andrea and Leisa were uncertain about how to read research. With Ana Marie, it is uncertain what she means by "believable." It could mean whether she thinks research findings could be translated to work in her classroom or it could mean whether she thinks the conclusions are believable based on the merits of the study itself. This is a point to bear in mind when interpreting Table 2.

Consistency of Teachers' Self-Descriptions

As Table 2 suggests, teachers' descriptions of how they read research is consistent with their beliefs about how research should influence their teaching. If teachers believe research should have a direct impact, they describe themselves as interested in research findings and they judge the study's merit by whether the findings can be translated into procedures that work in their classrooms. If teachers believe research should expand their understanding of teaching (indirect influence), they are concerned with the concepts and claims the author proposes and how the study's conclusions are supported by evidence in the study. Kathleen is the one clear exception to this. She believes research should have a direct impact, but she is interested in understanding the study apart from its immediate use.

Teachers with either a narrow or broad definition of research (i.e., teachers with clear ideas about research) said that they were interested in analyzing a study's concepts, claims, and evidence. Teachers with unclear ideas about the nature of research focused on research findings apart from the body of the research or were uncertain about how to read research. Thus, judging from teachers' self-descriptions, the manner in which teachers read research is related to having a firm idea of its nature and believing that reading it will expand their understanding of teaching.

Teachers Reading Research

Teachers read and responded to three articles and two research findings during a one-hour interview session. Teachers were required to read the articles prior to the

Table 2

Teachers' Prior Beliefs About Research and Self-Descriptions of How They Read It

Prior Beliefs	Reading Focus		
	Findings & Applications	Uncertain Focus	Concepts, Claims, & Evidence
Direct Impact[a] Unclear Definition[b]	Karla Nicole Lynda	Andrea Leisa	
Direct Impact Narrow Definition[d]	Jessica (BT)[c]		
Direct Impact Broad Definition[e]		Ana Marie	Kathleen (TC)[f]
Indirect Influence[g] Broad Definition			Fran (TC) Nick (BT)
Indirect Influence Narrow Definition			Cheryl (TC) Geoff (TC) Bryan (TC)

[a]The influence of research is only to provide teaching strategies and techniques to improve teaching.

[b]Teachers who mixed prescriptive statements about teaching and learning with various forms of inquiry.

[c]BT = Beginning teacher.

[d]Teachers who believe only quantitative studies (experimental, quasi-experimental, and correlational studies) constitute educational research.

[e]Teachers who believe qualitative (including teacher research), historical, philosophical, and quantitative studies constitute educational research.

[f]TC = Teacher collaborator.

[g]The influence of research is also to raise questions about teaching and to offer analytic frameworks with which teachers can better understand their teaching.

interview session and they were asked before or during the interview whether they indeed had read them.[5]

The articles were chosen to represent different types of research studies as well as for their brevity and potential interest to teachers. One article, "Teaching Critical Thinking in Elementary Social Studies" (Hunkins & Shapiro, 1967), is a quasi-experimental study of 54 fifth graders. The study investigated whether a case-method approach to teaching critical thinking was superior to a traditional lecture-textbook approach. Another article, "On Listening to What the Children Say" (Paley, 1986), is one teacher's descriptive study of how she responds and listens to children in her own classroom. A third article, Cuban's (1988) "A Fundamental Puzzle of School Reform," takes a different approach. Cuban, drawing on his historical studies, introduces conceptual distinctions in order to sort out the types of changes that have occurred in schools' organizational structure over the past century.

Teachers were asked to read the articles and were given the questions they would respond to before being interviewed. For each article they were asked the following questions:

1. What is the main thing the author seems to be trying to say, and how does he or she try to convince the reader? I mean, what does the author(s) do to make you to believe the article?

2. Is there anything in the article that you have trouble understanding?

3. What conclusions, if any, would you draw from the article for your teaching, and why these conclusions?

For all the articles together, study teachers were asked:

4. Did you enjoy any article more than the others? Why or why not?

5. In light of how you think research should help teachers, does any article succeed more than any other? Why or why not?

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[5]Four teachers (Andrea, Lynda, Karla, and Leisa) who enrolled in the master's level course on classroom research wrote out their responses to the questions (see below) about the three articles. Because I followed these teachers over time, I wanted to find out how they read research before their participation in the course started to influence their thinking. There was not enough time to interview them face-to-face before class began. Consequently, they wrote out their responses. These teachers also were required and given instructions to read the articles before answering the questions. The relevance of this different approach is discussed later.

6. Did the authors use similar kinds of evidence in each article to support their views? Was any evidence more or less convincing?

Teachers also read research findings during the interview session. The research findings included one finding on direct instruction from *What Works*, the 1986 U.S. Department of Education publication: "When teachers explain exactly what students are expected to learn, and demonstrate the steps needed to accomplish a particular learning task, students learn more" (p. 35). Teachers also read the one-half page comments and reference list that followed the finding.

The other finding was an adaptation of Phillips's (1971, 1980) example of how someone can draw different conclusions from a research finding depending on the values they hold or their assumptions about learning (linking premises).[6] The finding is that children under 11 cannot understand the national anthem. Study teachers were asked what they would say to an educational psychologist who observed their class and informed them of the finding. Finally, teachers were also asked, If there is good research evidence for a teaching practice, should you use the practice in your teaching? And, under what conditions can you ignore "good research"?

Analyzing Teachers' Responses

Substantive, important differences existed between teachers' responses to these questions. If research serves to educate teachers, teachers need to go beyond focusing only on research findings. They need to be able at least to render a (defensible) sense of authors' main ideas and how the authors supported those ideas. Teachers also may further analyze research in relevant ways that demonstrate greater ability to understand what they read.

To find out how teachers read the articles, a system was devised to analyze their responses. The system included elements linked to teachers' ability to provide defensible versions of the articles' main ideas and evidence. It also included elements linked to teachers' dispositions and abilities to analyze the articles' merits and to recognize underlying assumptions when reading research findings.

Numbers were assigned teachers based on how much their responses and reading processes matched those shown in Table 3. For items 1-3 teachers could receive up to 9 points. These items referred to direct questions that teachers should have thought about

[6]All teachers' read and responded to the research findings during the interview session. No teacher read the findings prior to the session.

or even written down prior to the interview. The remaining items (4-7) went beyond simply responding to the questions and focused more on analyzing the articles. These items were worth 2 points each. A good judge or critic of research could realistically score 40 points for the second set of items. So, the higher a teacher's score, the more willing and able he or she was to analyze the articles and findings.

The reading processes listed in Table 3 (5 a-f) were tied to reading different types of research. The inclusion of internal, external, and construct validity is based on Smith and Glass's (1987) broad criteria for judging the merit of research studies (see also Gay, 1987). Teachers' ability to judge the merit of studies is considered important for both quantitative and descriptive studies (Goetz & LeCompte, 1984; Hopkins, 1985; Smith & Glass, 1987). Recognizing conceptual distinctions, creating them, and questioning further the data's consistency is related more to analyzing philosophical and historical studies, though these processes may be appropriate for all types of studies (Floden & Buchmann, 1990; also see Gay, 1987, for analyzing historical data).[7]

As Table 4 indicates, how teachers read and responded to the articles and findings varied substantially. Table 4 presents overall scores which indicate the degree to which teachers' responses matched those included in Table 3 or focused more on the products of research. The higher the score, the more teachers' responses were related to the reading processes described in Table 3.

Each of the six teachers at the scale's bottom (with scores between 6-11) believed that research should have a direct impact on their teaching and either had a narrow or unclear conception of what research is. Teachers scored higher (between 13-27) when they had an indirect view of research's influence or a broad conception of what constitutes research. Teachers' responses, however, are not so clear cut. Some teachers with a direct view of research's influence or a narrow conception of research scored as high or higher than teachers with an indirect view and a broad definition. So even though Table 4 provides evidence for differences between teachers based on their prior beliefs about research, it is necessary to probe more deeply into how teachers made sense out of the articles and findings.

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[7]I have tried to exclude highly technical analytic skills related to different types of research studies that would be mainly the province of experts in the fields. One should not expect teachers, for example, to be experts in statistical analysis or in determining the authenticity or accuracy of historical data. If research, however, educates teachers, they need the ability to go beyond focusing on the products of research (see above). The province of this "middle ground" is currently being developed in another paper related to this study.

Reading Research With Less Understanding

The six teachers at the scale's bottom end shared common problems in reading articles and findings. They had greater difficulty identifying main points and evidence in the articles and/or were unable to further analyze the articles and findings.[8] Their problems were associated with a focus on what research products—teaching strategies or methods—they could take back with them into their classrooms after reading the articles and findings. Articles were judged less by their tie to evidence and more by whether it "shows you" what skills to use to improve your classroom. Articles are difficult to read when they do not give suggestions of "what might work, or what we need to try to do."

In addition, teachers at the lower end of the scale were more apt to claim that the only way to respond to research findings is to try out recommended practices drawn from them. Ignoring teaching practices drawn from research is legitimate only if those practices do not work in your class. There was less recognition that research incorporates different conceptions of learning or educational aims that teachers need to consider (Andrea, Jessica, Lynda).

Credible evidence and additional analysis of articles. One dominant theme with teachers at the lower end of the scale was thus their overidentification of credible evidence in the articles and findings with what they themselves can try out and see work in their classrooms. This identification was consistent with these teachers' relative lack of additional analysis of the articles and findings or their inability to pursue further any criticisms of the research articles.

Nicole, for example, liked best the Hunkins and Shapiro (1967) article on teaching critical thinking because it offered her something "concrete." Her distinction between evidence in the articles was that they all relied on "personal experience," but the Hunkins and Shapiro was most convincing because it proves that "there's a method there" she can use. Nicole did offer some further analysis of the articles and realized that she tends to jump to conclusions. Referring once again to the Hunkins and Shapiro quasi-experimental study, Nicole recognizes that the authors said nearly nothing about the instruction of the control group and realizes that this may weaken their case. Self-conscious about

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[8]As mentioned earlier, four of these teachers (those in the master's course: Lynda, Andrea, Karla, and Leisa) wrote out their responses. One criticism of their relative lack of focus on processing research when reading it is that the context of writing out responses did not lend itself to open-ended analyses of the articles as happened with other teachers who were interviewed face-to-face. This is a fair criticism. However, note that these teachers nonetheless had serious problems identifying main ideas and evidence in the articles. In addition, two teachers (Jessica and Nicole) who were interviewed about the articles and who shared similar prior beliefs about research had scores similar to these other four teachers. Finally, many teachers' scores were increased when positing different educational aims when reading the findings. The four teachers in the master's course had the same opportunities to do this as other interviewees.

Table 3

System for Analyzing Teachers' Responses and Reading Processes

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Articles (responses worth one point for each article)

1. Recognizing main ideas in each article.
2. Recognizing (broadly) how the author(s) tries to convince readers in each article.
3. Labeling different types of evidence for each article.

Additional Analysis of Articles and Research Findings (responses worth two points each)

4. Drawing conclusions for one's own teaching based on recognition of the main idea and evidence in the article.
5. Judging further the merits of an article (two points each for any response related to a-f)
   a. Recognizing and analyzing conceptual distinctions
   b. Creating and explaining distinctions based on the article
   c. Questioning further the data's consistency (apart from drawing conclusions as stated in 4. above
   d. Considering, if appropriate, the article's internal validity
   e. External validity
   f. Construct validity
6. Referring to or positing different conceptions of learning or educational aims when responding to and drawing conclusions from research findings or when talking about "ignoring good research."
7. Noting relevance of reading the studies on which a research finding is based in order to further evaluate that finding.

Table 4

Scores Indicating Teachers' Manner of Reading Research

Teacher	Processing Research Focus					Research Products Focus				
Cheryl (TC)[a]	27									
Fran (TC)		20								
Ana Marie		20								
Kathleen (TC)			18.5							
Nick (BT)[b]			18							
Geoff (TC)			18							
Bryan (TC)						13				
Nicole						12				
Jessica (BT)						11				
Leisa (MT)[c]						10				
Karla (MT)						10				
Lynda (MT)								8		
Andrea (MT)									6	

[a]TC = Teacher collaborator.

[b]BT = Beginning teacher.

[c]MT = Teachers taking a master's level course.

prematurely embracing the teaching methods the authors promote, Nicole wonders whether the authors may have been "biased toward the experimental treatment. And that's how they convinced me?" (Nicole, p. 13).

Nicole, however, does not pursue her rhetorical question. The importance of research evidence for a teaching practice should be taken with a grain of salt.

> And when I start reading this over more carefully, there's nothing real concrete. I'm talking out of both sides of my mouth because I first said it was a concrete concept that I could use, which there is. . . . But if they were really trying to prove their case, there's a lot of unknowns that they didn't include. So to say this is true I don't think you can really prove it by this article. And I think research is swayed—that you can find whatever it is you're looking for. (Nicole, p. 16)

Instead of being more careful about drawing conclusions from research when reading it, Nicole takes refuge in the view that research can prove anything, and so reading research closely is worth little. The only credible evidence for a teaching practice to Nicole remains what is immediate and tangible—what she can see work in her classroom.

Karla also believed that analyzing and evaluating research meant finding out how she can use it. Consequently, when reading the research articles she focuses on what the articles mean for her classroom teaching while misunderstanding or neglecting the articles' main ideas and evidence. This is most apparent when she responds to the Cuban (1988) piece:

> Cuban suggests that second-order changes need to be made. That is, instead of throwing all of education out, keep those things that are already in place and are working, and change and improve those that are not working. . . . I did not understand how Cuban gathered his information and came to his conclusions. . . . After reading the Cuban article, I have to ask myself what changes I need to make as a teacher. . . . Once I have identified the type of changes, I then need to decide the best way to go about making changes in the classroom or in education. (Karla, p. 20)

Unable to understand the Cuban article, Karla focuses nonetheless on what it means for her teaching. Specifically, she misses Cuban's point that significant change in the organization of education is dependent on broader social and political changes, and thereby draws faulty conclusions for her teaching from the article.

Jessica identified research with quantitative studies, wanting it to impact her teaching without reading it, and described herself as a "*Readers' Digest* type of person" (p. 11). She

liked the Hunkins and Shapiro (1967) article because of its direct use and furthermore suggested that the data in the article "spoke for itself." Consistent with this view, after reading the Cuban (1988) article Jessica stated that it had "no findings," because there were no data to support it. For these reasons

> it's not something that you could tangibly sit down and say, this is going to be the basis for our new school reform. No one is going to take that. Our school has got a policy now of not making decisions unless they are research-based. (p. 17)

Despite their misunderstandings of the articles, these teachers often were able to determine articles' main ideas and the ways in which authors tried to convince them. And, they sometimes displayed more sophisticated views of research. Karla, for example, states that none of the evidence in the articles is more convincing because the authors of each article set out to answer their own question and gathered their data to answer that particular question (p. 22). But Karla, like other teachers with similar prior beliefs about research, was generally less able and willing to judge the authors' conclusions in light of the evidence they provided and analyze further the articles' merits.

Is it important to value reading research? Having broader views of research's influence did not mean that a teacher read the articles with more understanding. Bryan, for example, was closer to teachers who focused more on research products than on processing research. Bryan valued the sense-making influence of research, but he placed less importance on reading research closely. Predictably, Bryan had problems understanding the Cuban article. Another result is that he interprets Paley's article idiosyncratically. He understands the piece to mean that a teacher does not have to worry if he or she spends school time discussing students' personal problems or engages in noninstructional activities:

> Some of the best days I have had teaching is when we did not really teach or learn anything; we just talked. Ice-skating was great today. [He took his students to ice skate during the school day.] You get out of school and kids aren't as guarded about what they talk about, and they'll say all kinds of things. And it's just like hanging out with your friends for a while. (Bryan, p. 20)

Bryan later admits that Paley helped feel him "less guilty" about wasting school time (p. 28). Personal interpretations of research such as this one must be guarded against, except insofar as the interpretation is defended in relation to the text. Without inclination to read texts

closely, it is likely that Bryan will settle on incomplete, less supported, idiosyncratic interpretations of research studies.

Reading Research Articles and Findings With More Understanding

Six teachers scored relatively high on the scale used to analyze their responses to the articles and findings. Cheryl scored the highest. She posited a different and well-formed conception of learning when responding to research findings and was in no way intimidated by the authority of research findings:

> I do not know what good research evidence is for a teaching practice. I mean if there's good evidence that screaming at kids and being abusive to them makes them more obedient and score higher on tests—I'm not interested and I don't care how good the research is. . . . I think it would be irresponsible and unprofessional for a teacher to join the bandwagon every time a good piece of research came out. (p. 34)

Cheryl's responses to the articles were consistent with her beliefs about the influence of research. She had described herself as someone who focused on research ideas rather than research products. When reading the articles, she concentrated on how important terms were defined by researchers, offered counterexamples, demonstrated an understanding of the authors' main points and then questioned their consistency and, in general, played with the ideas that she encountered. Cheryl described herself as someone who did not understand research evidence. Responding to the statistics in the Hunkins and Shapiro (1967) article, she states:

> I think that they are basically irrelevant to the importance of the article. But my hunch is that the writers felt that they needed to be taken seriously, to have this be looked at as more than a methods project in a methods book. That they needed numbers to make their piece look more serious. (p. 30)

Part of the reason Cheryl says this is because she does not understand the statistics. But another reason is that she already agrees with the theoretical framework the researchers propose, and statistically significant results from one article cannot shake her beliefs about how students learn.

> It would not have made any difference to me if they would have said that the students who had the case methods to develop their critical thinking scored

> lower on the posttesting. I still would have had the same question about the test itself, how it was scored, and if they're really testing critical thinking. . . . I would have been surprised if that had happened. It would defy everything I think about kids and subject matter—if they invest in what they're learning, they understand it. (pp. 30-31)

Cheryl does not understand the article's statistical analysis and its results cannot change her beliefs about learning. But she raises pertinent questions about it because she wants to understand the ideas presented in the research and how those ideas fit into her way of thinking.[9] In addition, Cheryl raises good questions about the evidence in the articles despite her doubts about what evidence is. She recognizes, for example, that the conclusions Paley or Hunkins and Shapiro draw are open to question. And, she looks to verify Cuban's conclusions by further reading in the area—not only by reference to her own experiences.

Noting the political contexts and the rhetoric of research. Teachers with broader views recognized more that research is shaped by the political context in which it is carried out and researchers' conceptions of worthwhile aims. Unlike Nicole, these teachers did not become cynical about in research when recognizing these points. After reading the finding on direct instruction and combing through the reference list, Fran says,

> I also think that you have to be aware of who the researchers were and what their perspectives were in order that they would do that kind of thing [research]. . . . And I read one article by Berliner, and I kinda know his perspective—which I sometimes agree with and I sometimes don't. (Fran, p. 35)

When asked whether he should use a teaching practice for which good research evidence exists, Geoff states that teachers need to be open to new teaching practices. He also wants to put distance between claims from teachers who say, "I've done the neatest thing in my class" (p. 30) and research studies. Furthermore, Geoff also believes that research projects are sometimes carried out within a political context in which the search is not simply for

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[9]Nick also argued, like Cheryl, that the statistical evidence in Hunkins and Shapiro (1967) was superfluous because he already believed in learning by discovery. Unlike Cheryl, Nick did not ask good questions about other parts of this study. Nick was, however, critical of Paley's (1986) study because he felt like she may have found only what she was looking for during her discussions with students. Therefore, he wanted to read her whole transcript and draw his own conclusions about students' responses. As a first-year teacher, he also saw the Cuban (1988) article as "a bit ivory tower," but found it the most interesting reading because Cuban offered a broader framework in which to understand teaching innovations (p. 26).

truth. This realization does not mean that he does not read and understand the research from which any teaching practice is derived.

> I can't say, oh yeah, that research is just politically done and they're just making sure they get the grant next year. But instead, I need to look at the research critically and think, is there something there? (p. 34)

Nick also touches on an important point recognized in the literature—the rhetoric of research. To persuade readers, researchers' often present their theories and conclusions as more certain than they actually are. Nick states that research often follows a formal structure that makes it seem as if the theory and conclusions are ironclad. Though the research may appear ironclad, Nick denies that it is:

> But they have to say it is, otherwise, why would anyone read it? It reminds me of this famous meeting of psychologists, Maslov, Rodgers, and Skinner. And Maslow and Rodgers were getting on Skinner [an environmental determinist]. So they asked him, you're saying that you had no choice in being here—you're here because events occurred in your life forced you here? And Skinner replied tongue in cheek—yes—realizing that it was kind of a ludicrous position, though he had to hold it to be consistent. (pp. 13-14)

These three teachers—Fran, Geoff, and Nick—combined more sophisticated views about the contexts and rhetoric of research with greater ability to judge the articles and findings. Fran, for example, was mainly concerned with articles' and findings' external validity. She believed that research should raise questions for teachers and bristled at inservices where research findings are presented as answers. Fran's remarks concentrated on whether the research samples were similar to students in her school district or school. "School systems seem to jump on the bandwagon too quickly without laying down the groundwork for it, without looking critically, carefully at their population" (p. 24).

Fran also mentions that teachers need to raise questions not only in relation to the school's population but also the research's consistency "with the ongoing philosophy of the school district" (p. 25). So, when Fran read the articles and findings she thought about how (a) she could try out recommended practices drawn from the research in her classroom; (b) the sample and its generalizability; and (c) its consistency with the school district's philosophy and, presumably, her own. Fran's responses were consistent with her belief that research studies should move teachers beyond a narrow focus on classroom techniques and with her interest in experimenting with new practices drawn from research and raising

questions about what happens. But, one problem with Fran's responses is that she did not mention other criteria for judging the articles, and so she may have overemphasized external validity as the only criterion for judging the merits of empirical studies.

Two teachers, Ana Marie and Kathleen, wanted research to impact on their teaching directly and included a broad range of research studies in their conception of what constitutes research.[10] Neither teacher focused primarily on research products when reading the articles and findings. Ana Marie stated that she did not feel teachers need to read research closely. She admitted, however, that reading research was in fact important to her when she was told or encouraged to include practices derived from research in her teaching, and she was not familiar and comfortable with these practices. Her defense of this way of looking at research's influence was dependent on her ability to evaluate research used to bring about changes in her teaching. When Ana Marie read the articles, she was, in fact, able to analyze them well, offering the most thorough criticisms among the study teachers of the Hunkins and Shapiro (1967) quasi-experimental study. Also, though she felt the Paley (1986) article contained good ideas, Ana Marie was circumspect about drawing conclusions from it because there was not enough information in the article about the teacher and her students.

Though Ana Marie's beliefs about research's influence are narrow, she nonetheless includes a broad range of research studies in her conception of what research is and she is able to read research better than most teachers included in the study. As a result, the possibility that different types of research will serve to educate her is far greater than teachers who cannot process research. These latter teachers may need other entry points in order to involve them in trying to understand research studies.

Teachers' Varied Conceptions of Credible Evidence

> Until we have practitioners who say, "I'm not going to use that until I've seen good experimental evidence for it," we're going to continue on the educational pendulum with the "miracle of the month" and will not make much serious progress. (Slavin, quoted in Brandt, 1988, p. 28)

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[10]When Kathleen responded to the Cuban (1988) article, her view of research's influence was broader than her initial identification with the "direct impact" view of research influence indicated. Ana Marie also responded favorably to the Cuban article. This suggests her direct impact view was less firm than she signified. However, Ana Marie liked Cuban because she was being asked to change her teaching practices, and the article helped clarify the conflicts she was experiencing over making these changes. Kathleen saw the benefits of the Cuban article though it had no immediate bearing; Ana Marie saw the benefits because it currently and directly related to her teaching. So, Ana Marie seemed more firmly tied to the direct impact-view.

Kathleen was one practitioner who agreed with Slavin, stating that "there must be statistical evidence if someone is going to change something" (p. 32). No teacher, however, read the Hunkins and Shapiro (1967) quasi-experimental study and understood the authors' statistical analysis of students' pre- and posttests even though five teachers saw this evidence as "most convincing" compared with the other articles. Teachers accepted the statistical analysis based on trust (e.g., Geoff and Nick). In addition, nine teachers (including Kathleen) had no understanding of what researchers meant when they warn readers not to mistake correlational with causal relationships. Besides the error of focusing only on experimental studies as a basis for change in teaching, Slavin's comment goes beyond what any teacher in the study was able to do.

Teachers nonetheless raised substantive questions about all the articles and were interested in different types of credible evidence when reading both articles and findings. The analysis of teachers' responses has established the poles. Teachers who believed that research should have a direct impact on their teaching and who had either narrow or unclear views of what constitutes research were grouped around one form of credible evidence. They read research with an eye mainly to what strategies they could try out in their classroom in order to determine how they worked with their students. They wanted research products without more consideration of the study's concepts, claims, and supporting evidence. Teachers who believed research should expand their understanding of teaching (indirect influence) and/or had a broad view of what constitutes research were grouped around another pole. Credible evidence was substantially wider for these teachers. They were more willing and able to process the concepts, claims, and evidence presented to them.

So, teachers in this latter group responded more flexibly to the articles and findings. This is not to say that these teachers focused only on, for example, figuring out what evidence supported a study. For all teachers, the articles and findings triggered their intuitive beliefs about what constitutes good teaching. Teachers were disposed to compare and contrast these intuitive beliefs without extensive consideration of the concepts and supporting claims in the articles and findings. Almost every teacher, for example, drew conclusions from the articles for their teaching whether or not they believed supporting evidence existed.

That teachers think about how something will work in their classroom without trying to understand the articles further makes sense. Sometimes teachers have trouble figuring out what researchers are doing and why. Important also is that teachers are accustomed to judging teaching ideas or strategies in which their main source of validation is their perception of what happens with their students. All teachers were disposed to treat the

ideas or strategies in the articles and findings in this same way. An article or finding presented an idea or a strategy and teachers drew a conclusion without caring about supporting evidence. Supporting evidence would be found by what happens in their classroom. But only teachers who thought of research more broadly went back and forth between thinking what the articles and findings meant for their teaching and considering supporting evidence.

Between these poles, teachers referred to other kinds of credible evidence that interested them. Table 5 describes the different types of evidence teachers mentioned as credible when responding to the articles and findings. Items 1 and 10 on the Table refer to the poles that have already been described. Item 1 refers to teachers' claim that what makes an article or finding credible is when it meshes with their personal experience. Items 2-9 represent credible evidence that is successively removed from teachers' direct classroom experience (item 1) and involves teachers more in trying to understand what an article is trying to communicate and why (item 10).

Table 5 indicates that teachers find persuasive their own observations of other teachers and teachers' descriptions of the results of implementing classroom innovations (items 2 and 3). At the other end, teachers included evidence activities as credible which, if successful, would deepen their understanding of research—finding out why strategies drawn from research work, doing further reading in a broader body of literature that supports an article's claims, and finding out more about the theoretical framework that informs a study.

Notable also as credible evidence is teachers' interest in what specifically students are learning (see items 4, 5, and 6). Teachers wanted to read about tests and methods used with students and students' responses to them—not just test scores. Teachers were also interested in transcriptions of student and teacher interactions and other types of descriptive cases. Materials such as these have a special importance. They could serve as a bridge to encourage teachers to go beyond focusing mainly on what works in their classrooms and to read research carefully and to think about the concepts, claims, and supporting evidence that form research studies.

Other teacher responses may be instrumental in motivating teachers to read research carefully. Teachers were interested in trying to further understand concepts and evidence when a study's conclusion did not match their own beliefs about teaching and learning (e.g., Jessica and Ana Marie). Furthermore, when teachers reflected on an article and recognized their interpretation was in conflict with evidence in the study, they were interested in thinking more about whether their interpretation was warranted (Bryan).

Table 5

Credible Evidence to Teachers

1. Idea or strategy meshes with their experience or using a strategy in their own teaching and seeing whether it works for them. All teachers, but teachers with direct impact view of research and/or narrow or unclear views of what constitutes research, identify mainly or exclusively with this.

2. Someone coming in and working with my students in which I have the opportunity to observe the teacher and see my students' response to this other person's teaching (Ana Marie, p. 29).

3. Checking with other teachers to find out how a new teaching innovation is working in their classrooms (Fran, p. 23).

4. Reading research that begins with a concrete case that illustrates the type of learning and teaching that went on in classrooms (Jessica, p. 17).

   "Walking through" descriptions of teacher-student interactions, like in Paley. This provided concrete examples of her experiences, which are helpful to teachers (Leisa, p. 17).

5. Transcripts of students' thinking and student interviews--test scores are not sufficient evidence (Bryan, p. 22).

6. Knowing specifically what students learn or were to learn in a study--examples of tests, questions asked students, materials to which students responded (Cheryl, p. 32).

7. Trying out an innovation, seeing how it works, and referring back to researchers to determine why things turned out the way they did (Fran, p. 22).

8. If claims can be verified through further reading to determine their accuracy (Cheryl, p. 32, referring to Cuban's claims).

9. First struggling with the broader framework in which the authors have asked their questions, starting a dialogue within this framework, and then I can understand how the evidence in the article fits into this framework (Nick, p. 27).

10. Judging further articles' merits in line with those described in Table 3 item 5 a-f. (Mainly teachers wanting research to expand their understanding of teaching and/or with broad views of what constitutes research.)

Conclusion

Common problems in reading articles and findings were most often associated with teachers who focused on research products. They had greater difficulty identifying authors' main ideas and evidence in support of these ideas. Consistent with this problem, these teachers relied more on personal interpretations of the articles as opposed to defensible interpretations based more firmly on the text. In addition, these teachers were less likely to draw on different conceptions of learning or educational aims when responding to research findings and when offering reasons for ignoring good research.

So, one answer to the question, How do teachers understand research when they read it? is that many teachers don't. When reading research, they were more interested in research products and were unwilling and/or unable to process it in ways described earlier. These teachers were like consumers interested in making decisions about what goods to procure without understanding further *why* the decision is warranted. Consequently, their relationship to the text begins and ends with the question, What should I do? The questions, What is the author saying? and Why should I believe this? are not raised and pursued meaningfully in reference to the text.

This conclusion goes beyond the concern of Frazier et al. (1935) that what teachers read about social issues was provincial, conventional, and sensational—much like the population at large. The data in this paper suggest that how many teachers read research may be no more enlightened than any consumer's approach to and interest in information that provides answers for areas in which they have little or no specialized knowledge. The problem is twofold. It is not simply what teachers read—as Frazier and his colleagues pointed out in their time—but more importantly the manner in which they read it.

One response to this latter point may be that teachers do have specialized knowledge of teaching and no specialized knowledge of research, therefore they have a defensible consumer approach to research which provides answers for their specialization—teaching. This assumes what can be convincingly challenged, namely, looking for research to provide answers is one limited way research can influence teachers.[11] Other teachers in the study did not share this more restricted view of research's influence (see Table 2), and these teachers generally made more attempts to understand the articles and findings. This

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[11]It assumes that if teachers have specialized knowledge of teaching, then they should look to research for answers like a mechanic who reads a trouble-shooting guide to figure out a car's sputtering or like a doctor who reads a manual to determine the cause of a patient's symptoms. But education is not an applied science as, for example, medicine or engine repair are. Judgments of aims play a prominent role in education and causal relationships for the attainment of these aims are rarely obtained (see Phillips, 1971; Tom, 1984). Also, insofar as teachers' specialized knowledge is not limited to teachers' knowledge of classroom particulars and other contextual information, there is less reason to believe that teachers' understanding of research could not inform and enhance their specialized knowledge of teaching.

consumer approach to reading research was more characteristic of teachers with narrow beliefs about the influence of research, and these beliefs are not shared by all teachers.

Two teachers, however, who wanted research to directly impact their practice also did not focus on research products (e.g., Ana Marie and Kathleen). These two teachers' views of what constituted research was broader, but it is unlikely that this was chiefly responsible for helping them read research with more understanding. More likely, Kathleen's reading of research while working as a teacher collaborator, or these teachers' opportunities to read research during courses on educational research, or their acquired ability to read well in general (see Norris & Phillips, 1987) accounts for their ability to respond more substantively to the articles and findings—despite their beliefs that research should directly impact their teaching and that they do not need to read research closely.

Earlier in this paper it was suggested that the manner in which teachers read research determines whether research serves to educate them. Teachers who read research to find out what to do have fastened upon research products (e.g. teaching strategies) as guides for action. Other teachers expanded their focus when reading research. These teachers considered more fully the concepts, claims, and evidence in the texts. They did not sever the connection to prospective acts but engaged in reading processes that furthered their understanding of the text. The tie to action was delayed and the possibility that research served to educate these teachers emerged.

Helping teachers read research does not mean that teachers must understand research studies in the manner Slavin (cited in Brandt, 1988) strongly recommends. If Slavin's suggestions are taken seriously, the situation seems nearly hopeless. Teachers cannot judge whether good experimental evidence supports a practice. No teacher was able or willing to analyze sophisticated statistical studies.

Teachers nonetheless can benefit from reading research closely. Teachers who understand the importance of research studies are willing and able to grasp authors' main ideas and discern generally the manner in which these ideas are supported. Importantly, they are able and willing to discuss research drawing on their analysis of a study's merits and their knowledge of teaching. They neither drew conclusions from research without reading it nor tried to understand research in isolation from their ideas about teaching.

Supporting teachers' efforts to benefit from research in this way is realistic. Teachers, however, need fewer technical though substantive explanations of how sophisticated forms of evidence support authors' ideas. Teachers also need encouragement to note salient, underlying assumptions about teaching and learning that guide research studies. Accessible, explicit descriptions of these assumptions would be relevant and useful as would accessible

descriptions of theoretical frameworks underlying research paradigms (see Confrey, 1987). Importantly, teachers also need sustained opportunities to conjoin their *understanding* of studies with their knowledge of teaching. Consequently, they need time and encouragement to work through research studies.

Finally, Good's (1989) statement that teachers who are too busy to read are not professionals misses the point. More aptly, reading research may be important, but how it is read is more consequential. Teacher educators and researchers will need to pay attention both to teachers' beliefs about research and how they read research—if research broadly conceived—is to play a role in educating them.

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